CLAIMS

1. A MOS power device, comprising:

a body of semiconductor material having a first conductivity type and a surface;

at least two gate regions, of semiconductor material, arranged on top of said surface of said body and insulated from said body by gate-insulation regions, said gate regions being arranged at a distance from one another and delimiting between them a window having a given width;

a body region housed in said body, underneath said window, said body region having a second conductivity type and a first doping level;

a conductive region, accommodated in said body region and facing said surface, said conductive region having said first conductivity type and a second doping level;

a dielectric region covering said gate regions; and

a metal region extending on top of said dielectric region and being in electrical contact with said body and conductive regions;

characterized by:

first contact regions, distinct from said body region, extending from said surface through said conductive region as far as said body region; and

second contact regions, extending in said conductive region and having said first conductivity type and a third doping level greater than said second doping level, said second contact regions extending at the side of said first contact regions;

in that said dielectric region further extends on top of said conductive region, at least piece-wise, throughout the width of said window and has first and second openings on top of said first and, respectively, second contact regions,

and in that said metal region extends through said first and second openings and is in direct electrical contact with said first and second contact regions.

2. The device according to claim 1, wherein said first and second openings are aligned to said first and second contact regions.

3. The device according to claim 1, wherein said window has an area and said conductive region extends throughout the area of said window.

4. The device according to claim 1, wherein said body regions and said conductive regions have a strip-like shape, and said first and second contact regions are arranged altemated along said strips.

5. The device according to claim 1, further comprising at least one further body region, one further conductive region, accommodated in said further body region, and further first and second contact regions, extending in said further conductive region and aligned in a first direction, said first contact regions being aligned with said further second contact regions and said second contact regions being aligned with said further first contact regions in a second direction perpendicular to said first direction.

6. The device according to claim 1, wherein said first contact regions have said second conductivity type and a fourth doping level greater than said first doping level.

7. The device according to claim 1, wherein said body has cavities inside said conductive regions underneath said first openings, and said first contact regions are formed by portions of said metal region housed in said cavities.

8. A process for manufacturing a MOS power device, comprising the steps of:

providing a body of semiconductor material having a first conductivity type and a surface;

forming at least two gate regions, of semiconductor material, on top of said surface of said body and insulated from said body by gate-insulation regions, said gate regions being arranged at a distance from one another and delimiting between them a window;

forming, in said body, underneath said window, a body region having a

second conductivity type and a first doping level;

forming, in said body region, a conductive region having said first conductivity type and a second doping level;

covering said gate regions and said surface, on top of said conductive region, with a dielectric region;

forming first and second openings in said dielectric region inside said window;

forming first contact regions, distinct from said body region and extending underneath said first openings and through said conductive region as far as said body region;

forming, in said conductive region underneath said second openings, second contact regions having said first conductivity type and a third doping level greater than said second doping level; and

forming a metal region on top of said dielectric region, said metal region extending through said first and second openings and being in direct electrical contact with said first and second contact regions.

9. The process according to claim 8, wherein said steps of forming first and second openings and first and second contact regions comprise the steps of:

performing a first photolithography to form said first openings;

forming said first contact regions through said first openings;

performing a second photolithography to form said second openings; and

forming said second contact regions through said second openings.

10. The process according to claim 9, wherein said steps of forming said first and second contact regions comprise introducing dopant species of said second and, respectively, first types.

11. The process according to claim 10, wherein said step of introducing dopant species comprises implanting with a dose and an implantation energy such as to cause said first contact regions to have a fourth doping level greater than said second doping level.

12. The process according to claim 8, wherein said step of forming first contact regions comprises forming cavities in said conductive region underneath said first openings as far as said body region, and depositing said metal layer inside said cavities.

13. A MOS power device including a body structure forming a drain region of the device, a body region formed in the body structure, a source region formed in the body region, and a two gate regions each formed adjacent and insulated from the body region, the device comprising:

at least one body contact region formed in the source region and extending through the source region to the body region, each body contact region having a first conductivity type and the body region having the first conductivity type, and each body contact region being more heavily doped than the body region;

at least one source contact region formed in the source region, each source contact region having a second conductivity type and the source region having the second conductivity type, and each source contact region being more heavily doped than the source region; and

a source contact region formed on the body and source contact regions.

14. The device of claim 13 wherein the body structure comprises a semiconductor substrate having the second conductivity type and an epitaxial layer formed on a surface of the substrate, the epitaxial layer having the second conductivity type and being more lightly doped than the substrate and the body region being formed in the epitaxial layer.

15. The device of claim 14 wherein the source contact region comprises a metal layer.

16. The device of claim 15 wherein the body region and source region have a strip-like shape and have a longitudinal axes.

17. The device of claim 16 wherein the source and body contact regions are alternately formed along the longitudinal axes of the body and source regions.

18. The device of claim 17 wherein the first conductivity type comprises a P-type conductivity and the second conductivity type comprises an N-type conductivity.

19. An electronic system including a MOS power device having a body structure forming a drain region of the device, a body region formed in the body structure, a source region formed in the body region, and a two gate regions each formed adjacent and insulated from the body region, the MOS power device including,

at least one body contact region formed in the source region and extending through the source region to the body region, each body contact region having a first conductivity type and the body region having the first conductivity type, and each body contact region being more heavily doped than the body region;

at least one source contact region formed in the source region, each source contact region having a second conductivity type and the source region having the second conductivity type, and each source contact region being more heavily doped than the source region; and

a source contact region formed on the body and source contact regions.

20. The electronic system of claim 19 wherein the system comprises a computer system.

21. A method of forming a MOS power device in a body structure having a first conductivity type, the method comprising:

forming a body region in the body structure, the body region having a second conductivity type;

forming a source region in the body region, the source region having the first conductivity type;

forming two gate regions adjacent the source and body regions and insulated from the source and body regions, an opening being defined between the two gate regions and at least a portion of the source region being exposed in the opening;

forming in the exposed portion of the source region at least one body contact region, each body contact region having the second conductivity type and extending through the source region to the body region, and each body contact region being more heavily doped than the body region; and

forming in the exposed portion of the source region at least one source contact region, each source contact region having the first conductivity type and being more heavily doped than the source region.

22. The method of claim 21 wherein forming in the exposed portion of the source region at least one body contact region comprises implanting in selected portions of the source region a dopant to change the conductivity type of the source region in these portions from the first type to the second type.

23. The method of claim 21 wherein forming in the exposed portion of the source region at least one source contact region comprises implanting in selection portions of the source regions a dopant to more heavily dope these portions with the first conductivity type than the source region.

24. The method of claim 21 wherein forming the source and body contact regions comprises:

forming a mask over the opening;

removing portions of the mask; and

forming the source and body contact regions through the removed portions of the mask.

25. The method of claim 21 wherein forming the source and body contact region does not substantially affect respective doping profiles of the source and body regions.

26. A method of forming a MOS power device in a body structure having a first conductivity type, the method comprising:

forming a body region in the body structure, the body region having a second conductivity type;

forming a source region in the body region, the source region having the first conductivity type;

forming two gate regions adjacent the source and body regions and insulated from the source and body regions, an opening being defined between the two gate regions and at least a portion of the source region being exposed in the opening;

removing portions of the exposed portion of the source region to form at least one body contact region; and

forming in the exposed portion of the source region at least one source contact region, each source contact region having the first conductivity type and being more heavily doped than the source region.

27. The method of claim 26 wherein removing portions of the exposed portion of the source region to form at least one body contact region comprising anistropically etching these portions of the source region until the body region is exposed.

28. The method of claim 27 further comprising forming body contact portions in the removed portions of the source region.

29. The method of claim 29 wherein the portions of the source region are removed to a depth to provide a desired doping profile of the body region having a greater concentration of a dopant in the body region than does a surface of the body region that is exposed.